Pre-Permit Construction Approval and Permit to Construct Application

Idaho Milk Products
Milk Processing Facility
Jerome, Idaho

November 5, 2007

Prepared for:

Idaho Milk Products, Inc.
165 South 100 East
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Section 1 – Process Description

1.0 Introduction

Idaho Milk Products, Inc. (IMP) proposes to construct a milk processing plant at a site located at 165 South 100 East in Jerome, Idaho. The plant will receive up to 3 million pounds per day (lb/day) of raw milk by tanker truck. Milk will be processed in two natural gas fired dryers to prepare dry products from milk. Air blown through the dryers will flow through multiple particulate capturing devices (including: cyclones, baghouses, and/or a scrubber) to recover product powder and reduce particulate emissions. Dried products from the dryers will pass through a fluid-bed, then to packaging. There will be two boilers at the facility that will combust natural gas to produce steam for heat processes at the plant. An emergency generator will supply backup bower in the case of an interruption in the main power supply. See the Figure 1 – Process Flow Diagram MPC and Skim Products and Figure 2 – Process Flow Diagram Permeate Products (Section 2) for a graphical depiction of the processes to be incorporated into the operations at the milk processing plant. In addition, Appendix 6 contains a block flow diagram illustrating the mass balance of material inputs and outputs for the MPC and Permeate processes. Process Flow Diagrams provided by C/E/Rogers are also included in Appendix 6; these process flow diagrams list the mass balance for the powder processing components of the facility. The following discussion provides further details regarding the proposed milk processing operations.

1.1 Process Description

Products

Normally two products will be manufactured at the facility, dryed protein powder (MPC) and dryed lactose powder (Permeate). Subject to market conditions, the facility can be operated to produce dryed skim milk (not preferred operating condition due to lower profit potential for dryed skim milk). In the event that skim milk production occurs at the facility, no other products can be manufactured during the time that skim milk drying is in process.

Unloading

Up to 3 million pounds per day of raw dairy milk will be unloaded from tanker trucks at the plant. There are no point source air emissions identified for this process operation.

Skimming/Separation/Pasteurization

Raw milk will be heated then separated into skim milk and sweet cream. The skim milk will be pasteurized and cooled then sent to storage. The sweet cream will be pasteurized and cooled then sent to storage to await loadout. There are no point source air emissions identified for this process operation.

Skim Component Processing

The Skim component is pumped to the Ultra-filtration Membrane (UF) unit which separates the (a) protein fraction of the milk from the (b) lactose / ash fraction. This step also incorporates water into the process to dilute the protein fraction and re-filter

it (Dia-filtration) to flush more lactose and ash away from the protein resulting in a higher concentration of protein.

(a) The protein fraction (MPC) is then pumped to holding tanks to await further processing.

(b) The lactose / ash fraction (permeate) is pumped to the balance tank of the Reverse Osmosis (RO) system. The RO system concentrates the lactose and ash by removing water only. The water is pumped to the "Polisher" balance tank while the permeate is pumped to the balance tank of the permeate evaporator for further concentration.

The MPC is pumped to the Ultra-Osmosis (UO) unit, another membrane unit that removes water as well as ash from the protein fraction, further concentrating the MPC for optimal drying. The MPC is heated to approx 130 degrees F. prior to entering the UO. The UO Concentrate is then pumped to the balance tank of the MPC dryer. The permeate fraction of the UO process is pumped back to the RO system to recover water and permeate solids. The facility is limited to processing a maximum of 3 million pounds of milk per day due membrane capacity at the plant.

MPC / Skim Dry Product Process

The concentrated MPC (preferred) or skim (alternate) is pumped from the dryer balance tank, through a strainer, and is pumped into the main dryer body (P101), using a high pressure pump. Air used in drying, passes over a Maxon Cross-Fire natural gas fired burner and enters the dryer through the top of the main chamber. Air is exhausted through four ports to four cyclone collectors. Powder collected in the cyclones will be conveyed to the fluid-bed. Air from the cyclones will exhaust into two baghouse collectors (P101A and P101B). Powder collected in the dryer baghouses will also be conveyed to the fluid-bed. Air from the fluid-bed will exhaust into a baghouse (P102) and powder collected in this baghouse will be conveyed to the fluid-bed. Exhaust from the fluid-bed baghouse will discharge to the atmosphere. The powder product will be conveyed to a sifter and then to storage silos. The maximum production of MPC is 104,208 lb/day and 5,976 lb/hr. The daily production limit is based on the membrane capacity at the plant and maximum hourly operating hours of 20 hr/day. The hourly limit is based on the design capacity of the powder handling equipment at the plant. The maximum production of dryed skim milk is 13,491 lb/hr (neither MPC or Permeate can be produced at the same time as dryed skim milk).

Permeate Dry Product Process

Concentrated permeate is received into the evaporator balance tank from the RO unit. Permeate is then heated and pasteurized prior to entering he evaporator. The evaporator is a multi-pass Mechanical Vapor Recompression (MVR) unit with a Thermal Vapor Recompression (TVR) finisher. Upon exiting the finisher, the concentrated permeate passes through a "flash cooler" where the temperature is lowered for delivery to one of four crystallizer tanks. The concentrated permeate is slowly cooled in the crystallizer. The process allows the lactose in the concentrate to form crystals and bind the ash to allow a more "fluid" product that will dry easier.

The crystallized permeate is pumped from a crystallizer tank and is preheated. The heated concentrate is then strained and pumped into the main body of the dryer using a high pressure pump. The dried permeate will discharge onto a lactose conversion belt and fluid bed re-dryer / cooler. The powder will be conveyed pneumatically to a sifter and then on to one of two permeate storage silos. The powder receiving area will have one baghouse (P105) with exhaust that will discharge to the atmosphere.

Air used in drying, passes over a Maxon Cross-Fire natural gas fired burner and enters the dryer through the top of the main chamber. Air is exhausted through two ports to two cyclone collectors. Powder from the cyclones drops to a fluid-bed, while the air then enters a sanitary scrubber (P103) prior to discharge to the atmosphere. Powder collected in the fluid-bed baghouse will be conveyed back to the fluid-bed and the exhaust from the fluid-bed baghouse (P104) will discharge to the atmosphere. The maximum production of Permeate powder is 163,992 lb/day and 9,096 lb/hr. The daily production limit is based on the membrane capacity at the plant while the hourly limit is based on the design capacity of the powder handling equipment at the plant.

Packaging

Powder will be conveyed from one of four silos to either a bag filler or to a tote filler. The powder silos are equipped with a baghouse filtering system and the air used in conveying is discharged back into the plant environment.

Utilities

Two natural gas boilers (P106 and P107) will provide steam for a variety of heat processes at the facility. The boilers are sized to be fully redundant.

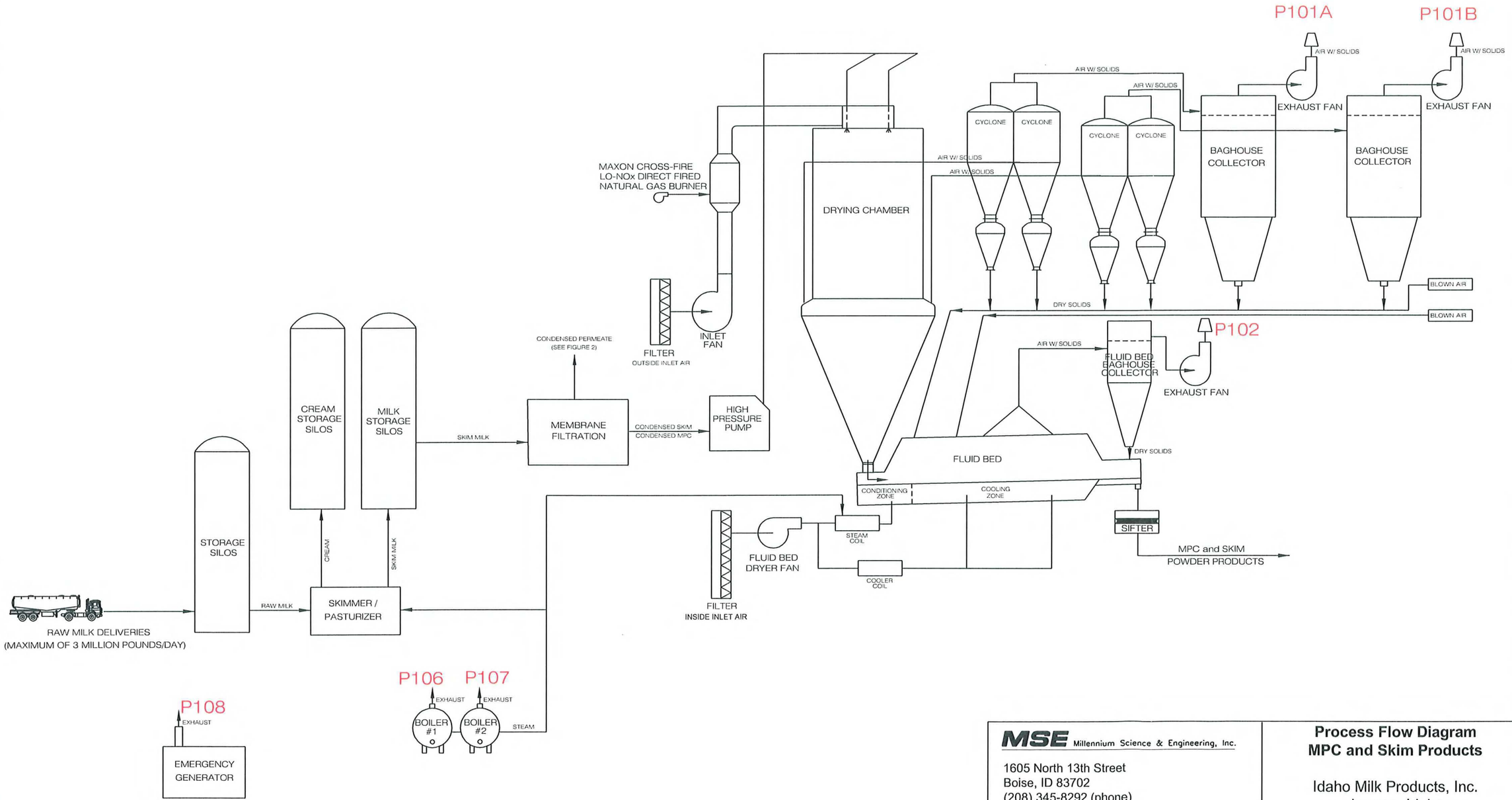
An emergency generator (P108) will provide backup power in the event of a power outage. The generator engine will combust diesel fuel.

Control Equipment Maintenance and Operation

The baghouses will use differential pressure transmitters and broken bag detectors to monitor performance. Required baghouse maintenance involves cleaning of the baghouse at least once per year, and replacement of broken bags. Complete bag replacement should be done at the time of cleaning.

The scrubber system incorporates a density meter to monitor the solids levels in the circulating water as well as a differential pressure transmitter to monitor pressure drop across the unit. The scrubber system will be cleaned on the same interval as the dryer wet side.

Section 2 – Process Flow Diagram



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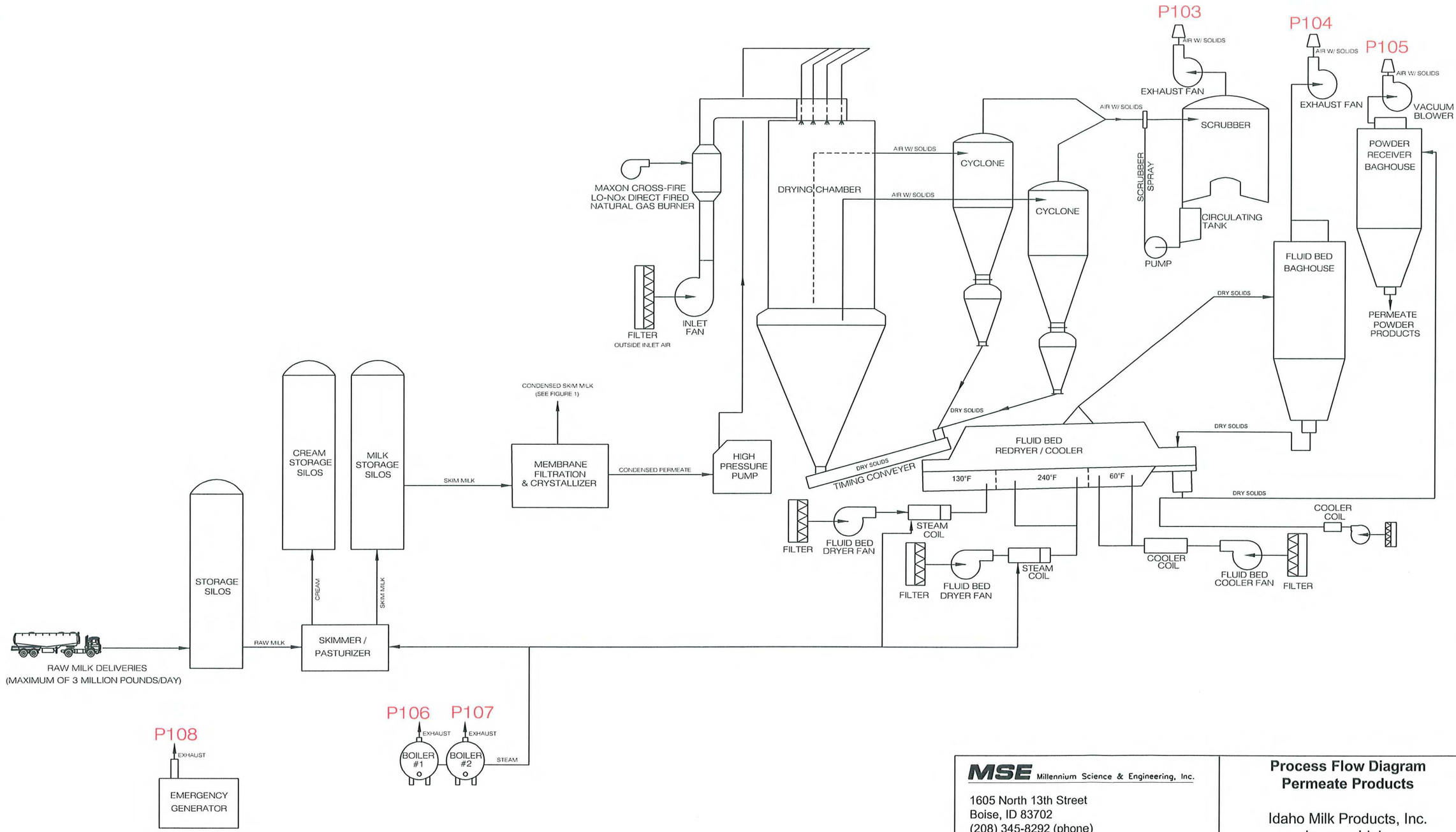
Process Flow Diagram
MPC and Skim Products

Idaho Milk Products, Inc.
Jerome, Idaho

10-22-07 | Figure 1



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Process Flow Diagram
Permeate Products

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